Paragraph 4. Abstract of the Disclosure

An abstract of the disclosure on a separate sheet is provided herewith.

Paragraph 7. Rejection of Claims 24-32 Under 35 U.S.C. § 112, First Paragraph

Claims 24-32 are rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors, at the time the application was filed, had possession of the claimed invention. In the Examiner's opinion, the specification does not provide an adequate written description of the claimed fusion proteins containing primate MAdCAM. The Examiner states, "[i]n the instant application, the amino acid itself or isolated protein is required" (Office Action at page 3, lines 19-20). Thus, the Examiner appears to suggest that an adequate written description of the claimed fusion proteins containing primate MAdCAM requires the disclosure of the amino acid sequences of all claimed primate MAdCAMs or of the isolated proteins. The Examiner cites *Fiers v. Revel* 25 USPQ2d 1601 (CAFC 1993) and *Amgen, Inc. v. Chugai Pharmaceutical Co., Ltd.* 18 USPQ2d 1016 (Fed. Cir. 1991) as supporting his position.

The *Amgen* and *Fiers* decisions relate, in part, to conception of claimed DNAs encoding erythropoietin (EPO) and human β-interferon, respectively. *Fiers* also relates to written description of claimed DNA. In *Amgen*, the court held that conception of a claimed gene requires that the inventor be able to define it so as to distinguish it from other materials, and to describe how to obtain it. The court further held that it is not sufficient to define a DNA solely by its principal biological property (i.e., the protein it encodes), because an alleged conception having no more specificity than that is simply a wish to know the identity of any material with that biological property. The *Fiers* court held that if conception of a claimed DNA requires a precise definition so as to distinguish it from other materials, then a written description of the DNA requires the same degree of specificity. Thus, the written description requirement of 35 U.S.C. § 112 requires that a claimed nucleic acid, like other chemical inventions, be described with sufficient precision to distinguish it from other materials, for example, by a structure (e.g., sequence), formula, chemical name, a method of production, physical or chemical properties or by whatever characteristics sufficiently distinguish the nucleic acid from other materials. Therefore, adequate written description of a claimed DNA or protein under 35 U.S.C. § 112, first paragraph, does not require a recitation of the nucleotide or amino acid sequence of the

claimed DNA or protein.

The Examiner further cites *The Regents of the University of California v. Eli Lilly and Company* 43 U.S.P.Q.2d 1398 (Fed. Cir. 1997) where the court found claims of U.S. Patent No. 4,652,525 (the '525 patent), drawn toward DNA encoding vertebrate, mammalian or human insulin to be invalid for lack of an adequate written description of the claimed subject matter. The disclosure of the '525 patent includes the nucleotide sequence of a cDNA encoding rat insulin and a prophetic example teaching a method for isolating a cDNA encoding human insulin (U.S. Patent No. 4,652,525 at Examples 5-6). However, the patent does not include a description of the characteristics of any cDNAs encoding insulin other than rat insulin. The court held that a description of rat insulin cDNA is not a description of the broad class of vertebrate or mammalian cDNA, stating:

> A description of a genus of cDNAs may be achieved by means of a recitation of a representative number of cDNAs, defined by nucleotide sequence, falling withing the scope of the genus or of a recitation of structural features common to the members of the genus, which features constitute a substantial portion of the genus.

Ibid. at 1406. The court recognized that adequate description of a genus of cDNAs can be achieved by distinguishing the members of the genus from other materials in other ways. However, the court did not speculate as to what other ways might be proper. Accordingly, it is appropriate to look to *Amgen* and *Fiers* for guidance as to other ways of describing a genus of cDNAs that could satisfy the requirements of 35 U.S.C. § 112, first paragraph.

It appears that the Examiner believes that the instant application is analogous to the '525 patent. Applicants respectfully disagree as the cases are readily distinguished. As discussed above, the'525 patent claims cDNA from all vertebrates and mammals, two exceedingly large genera which encompass multitudinous animal species having extensive genetic diversity. In contrast, the instant application claims fusion proteins that include primate MAdCAM or naturally occurring primate MAdCAM. The claimed genera of primate or naturally occurring primate MAdCAM encompass proteins from a discrete subgroup of animals that are closely related genetically. The amino acid sequences of three species of primate MAdCAM (SEQ ID NOS:2, 4 and 6) are disclosed in the specification. The recitation of the amino acid sequence of three species of primate MAdCAM in the specification is sufficient to reasonably convey to the skilled artisan that Applicants were in possession of the claimed fusion proteins that include naturally occurring primate MAdCAM or primate MAdCAM at the time the application was

filed. Accordingly, the specification provides adequate written description of the claimed invention.

The disclosure of the instant application goes beyond the standard for compliance with 35 U.S.C. § 112, first paragraph, set in *The Regents of the University of California v. Eli Lilly and Company* 43 U.S.P.Q.2d 1398 Fed. Cir. 1997), as further written description of preferred primate MAdCAMs which can be part of the claimed fusion proteins is provided. For example, preferred primate MAdCAMs are described as having an amino acid sequence that is at least about 55% similar to SEQ ID NO:2, SEQ ID NO:4 or SEQ ID NO:6 (page 17, line 24 *et seq.*). This description sets forth structural features of the claimed primate MAdCAMs which are sufficient to distinguish them from other materials, such as MAdCAM proteins from non-primates. Evidence of the sufficiency of the description for distinguishing the claimed primate MAdCAMs is provided in the specification, where the results of a study comparing the amino acid sequences of murine MAdCAM to macaque or human MAdCAM are reported. The comparisons revealed that the amino acid sequences of the murine protein and the macaque protein (SEQ ID NO:6) are only 44.3% similar, and the amino acid sequences of the murine protein and a human protein (SEQ ID NO:2) are only 39% similar (page 58, lines 9-12). Thus, Applicants' description of preferred primate MAdCAMs as proteins that have at least about 55% amino acid sequence similarity to SEQ ID NO:2, 4 or 6, is sufficient to distinguish the claimed fusion proteins from other materials. Therefore, such a description is sufficient to meet the requirements of 35 U.S.C. § 112, first paragraph.

In view of the foregoing, the subject matter of Claims 24-26, 28-32 and new Claims 101-134 is described in the specification in such a way as to reasonably convey to one skilled in the art that Applicants had possession of the claimed invention at the time the application was filed. Thus, the application satisfies the written description requirement of 35 U.S.C. § 112, first paragraph. Reconsideration and withdrawal of the rejection are respectfully requested.

Paragraph 9. Rejection of Claims 24-32 Under 35 U.S.C. § 112, Second Paragraph

Claims 24-32 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner states that Claims 24, 25 and 27 are indefinite in the recitation of "MAdCAM" because it is unclear what the term means or encompasses, and that Claim 25 is indefinite in the recitation of "variant thereof".

Claim 27 has been cancelled. Claims 24 and 25 have been amended to recite "naturally occurring primate MAdCAM" and Claims 25 has been further amended to delete the phrase "or variant thereof", thereby obviating the rejection of Claims 24-32 on this basis.

Paragraph 12. Rejection of Claims 24-31 Under 35 U.S.C. § 102(b)

Claims 24-31 are rejected under 35 U.S.C. § 102(b) as being anticipated by Butcher *et al.* (WO 94/13312). The Examiner states that Butcher *et al.* teach fusion protein containing murine MAdCAM and the murine MAdCAM would be a primate MAdCAM, as defined in the specification, because it has one amino acid in common with a species of primate MAdCAM disclosed in the specification.

The claims have been amended to recite "naturally occurring primate MAdCAM", thereby obviating the rejection.

New Claims 102-135 are drawn toward fusion proteins comprising a MAdCAM moiety having a specified amino acid sequence, for example, a sequence about 55% similar to SEQ ID NO:2, SEQ ID NO:4 or SEQ ID NO:6. The claims set forth structural features of the fusion proteins comprising primate MAdCAMs which distinguish the claimed fusion proteins from murine MAdCAM.

Paragraph 13. Rejection of Claims 24-32 Under 35 U.S.C. § 102(e)

Claims 24-32 are rejected under 35 U.S.C. § 102(e) as being anticipated by Capon *et al.* (U.S. Patent No. 5,565,335). The Examiner states that the immunoadhesion fusion proteins taught by Capon *et al.* would be primate MAdCAMs, as defined in the specification, because they have one amino acid in common with a species of primate MAdCAM disclosed in the specification.

The claims have been amended to recite "naturally occurring primate MAdCAM", thereby obviating the rejection.

New Claims 102-135 are drawn toward fusion proteins comprising a MAdCAM moiety having a specified amino acid sequence, for example, a sequence about 55% similar to SEQ ID NO:2, SEQ ID NO:4 or SEQ ID NO:6. The claims set forth structural features of the fusion proteins comprising primate MAdCAMs which distinguish the claimed fusion proteins from the immunoadhesion fusion proteins disclosed by Capon *et al.*

Related Applications Paragraph

The specification is being amended in the Related Applications paragraph to correct the relationship between the referenced applications. Applicants request that the Examiner confirm that the relationship between the referenced applications as set forth in the amended paragraph (see page 2, above) is correct in the U.S.P.T.O. records.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call Helen E. Wendler, Esq. at (781) 861-6240.

Respectfully submitted,

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